

Application No. 10/064,939  
Docket No. 13DV-13676  
Amendment dated January 23, 2004  
Reply to Office Action of October 23, 2003

### REMARKS

In the Office Action, the Examiner reviewed claims 1-3, 6, 7, 10-19, 21, 23, 24 and 27-31 of the above-identified US Patent Application, with the result that claim 16 was rejected under 35 USC §112, second paragraph, and all of the claims were rejected under 35 USC §§102 and/or 103. In response, Applicants have amended the specification and claims as set forth above. More particularly:

The specification has been amended to update the status of U.S. Patent Application Serial No. 09/833,446 to Rigney et al. (Attorney Docket No. 13DV-13490), which issued as U.S. Patent No. 6,586,115 after the filing of the present application.

Independent claims 1 and 19 have been amended to specify that the cubic microstructure of the outer coating/thermal barrier coating (26) is a fluorite cubic microstructure, thereby distinguishing the microstructure from pyrochlore cubic microstructures.

Independent claim 1 has also been amended recite yttria as an optional second stabilizer for the hafnia-based compositions.

Independent claim 19 has also been amended to eliminate hafnia stabilized by only yttria as one of the hafnia-based compositions.

Independent claims 1 and 19 and dependent claim 7 have been amended to use the transitional phrase "consisting of" instead of "consisting essentially of" when

Application No. 10/064,939  
Docket No. 13DV-13676  
Amendment dated January 23, 2004  
Reply to Office Action of October 23, 2003

reciting the constituents of the zirconia-based composition, and dependent claims 11-15 have been amended to use the transitional phrase "consisting of" instead of "consisting essentially of" when reciting the constituents of the hafnia-based composition.

Dependent claims 14 and 30 have been amended to specify that the outer coating is the hafnia-based composition and contains about 4 to about 5 weight percent yttria. Support for this amendment can be found in Applicant's specification at paragraph [0018].

Dependent claim 16 has been amended to recite a hafnia-based composition in a manner consistent with claims 11-15 and its amended parent claim 1. Limiting the stabilizer to gadolinium oxide or ytterbia finds support in Applicant's Table II.

Favorable reconsideration and allowance of remaining claims 1-3, 6, 7, 10-19, 21, 23, 24 and 27-31 are respectfully requested in view of the following remarks.

**Rejection under 35 USC §112, Second Paragraph**

Claim 16 was rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as his invention. The rejection was based on what the Examiner considered to be an inconsistency between claim 16 and its parent claim 1. In response, Applicant has amended claim 1 to recite the hafnia-based composition as consisting essentially of hafnia, at least one stabilizer, and yttria as an optional second stabilizer,

Application No. 10/064,939  
Docket No. 13DV-13676  
Amendment dated January 23, 2004  
Reply to Office Action of October 23, 2003

and has amended claim 16 to specify the hafnia-based composition as consists of hafnia, the at least one stabilizer, and a specified amount of yttria.. Applicant believes that these amendments overcome the basis for this rejection, and therefore respectfully requests its withdrawal.

### **Prior Art Rejections**

As now amended, independent claims 1 and 19 and their remaining dependent claims encompass the following coating compositions:

- zirconia stabilized with only erbia;
- zirconia stabilized with only neodymia;
- zirconia stabilized with only samarium oxide; and
- hafnia stabilized with dysprosia, gadolinium oxide, samarium oxide, and/or ytterbia, with the optional further addition of yttria.

The claims were rejected under 35 USC §§102 and 103 as being anticipated by and unpatentable over:

- U.S. Patent No. 4,774,150 to Amano et al. (Amano), cited as disclosing a coating composition containing zirconia, yttria, and samaria;
- U.S. Patent No. 6,025,078 to Rickerby et al. (Rickerby), cited as disclosing a coating composition containing zirconia, yttria, and one of neodymia,

Application No. 10/064,939  
Docket No. 13DV-13676  
Amendment dated January 23, 2004  
Reply to Office Action of October 23, 2003

dysprosia, gadolinia, erbia and ytterbia;

- U.S. Patent No. 5,512,382 to Strangman, cited as disclosing a coating composition containing hafnia stabilized by yttria;
- U.S. Patent No. 6,284,323 to Maloney, cited as disclosing a coating composition containing zirconia, yttria, and gadolinia, and a coating composition containing hafnia and gadolinia or yttria.
- U.S. Patent No. 6,586,115 to Rigney et al. (Rigney), cited as disclosing a coating composition containing zirconia, yttria, and neodymia; and
- U.S. Patent No. 6,387,539 to Subramanian, cited as disclosing a coating composition containing hafnia stabilized by dysprosia, gadolinia, samaria or ytterbia, or zirconia stabilized by samaria or erbia.

Regarding the rejections based on Amano, Rickerby, and Rigney for their disclosures of compositions containing zirconia, yttria, and an additional oxide, Applicant believes the presence of any significant amount of yttria is now excluded from Applicant's claimed zirconia-based compositions in view of Applicant's use of the transitional phrase "consisting of" when setting forth the chemistries of the zirconia-based composition. Therefore, Applicant respectfully requests withdrawal of the rejections citing Amano, Rickerby, and Rigney.

Regarding the rejections based on Strangman for his disclosure of a

Application No. 10/064,939  
Docket No. 13DV-13676  
Amendment dated January 23, 2004  
Reply to Office Action of October 23, 2003

composition containing hafnia and yttria, Applicant has amended claim 1 to require the presence of dysprosia, gadolinium oxide, samarium oxide, or ytterbia in the hafnia-based composition, while specifying yttria as an optional constituent. Therefore, Applicant respectfully requests withdrawal of the rejection citing Strangman.

Regarding the rejections based on Maloney's disclosure of a composition containing zirconia, yttria, and gadolinia, Applicant believes the presence of any significant amount of yttria is now excluded from Applicant's claimed zirconia-based compositions in view of Applicant's use of the transitional phrase "consisting of" when setting forth the chemistries of the zirconia-based composition. Regarding the rejections based on Maloney's disclosure of a composition containing hafnia and either gadolinia or yttria, such compositions are limited to pyrochlore cubic microstructures, which Applicant believes have been distinguished by Applicant's amendments requiring that the claimed coating compositions are fluorite cubic microstructures. Therefore, Applicant respectfully requests withdrawal of the rejections citing Maloney.

Regarding the rejections based on Subramanian's disclosure of a composition containing zirconia and samaria or erbia and a composition containing hafnia and dysprosia, gadolinia, samaria, or ytterbia, such compositions are limited to pyrochlore cubic microstructures, which Applicant believes have been distinguished by Applicant's amendments requiring that the claimed coating compositions are fluorite cubic microstructures. Therefore, Applicant respectfully requests withdrawal of the rejections

Application No. 10/064,939  
Docket No. 13DV-13676  
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citing Subramanian.

**Closing**

In view of the above, Applicants believe that the prior art of record does not anticipate or suggest independent claims 1 and 19 or any of their remaining dependent claims. Applicants therefore respectfully request withdrawal of the rejections under 35 USC §§102 and 103, and that his patent application be given favorable reconsideration.

Should the Examiner have any questions with respect to any matter now of record, Applicant's representative may be reached at (219) 462-4999.

Respectfully submitted,

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